ABSTRACT:

This study presents experimental results on the application of dissolved gas-in-oil analysis (DGA) technique to a soy seed-based oil and mineral oil. The investigations covered three common types of transformer faults: partial discharge, arcing and overheating. Experiments were performed on laboratory models of transformer windings immersed with the test oils at three different moisture levels (low, medium or high) and with or without the presence of solid insulating materials (pressboard). Five key dissolved hydro-carbon gases, namely hydrogen (H 2), methane (CH 4), ethane (C 2H 6), ethylene (C 2H 4) and acetylene (C 2H 2), generated by the three fault types in soy seed oil are analysed and compared with mineral oil fault gases. The classical Duval Triangle and Roger's ratio methods are applied to classify the fault type. The findings confirm direct application of classical DGA faults interpretation methods, developed for mineral oils, to non-mineral oils is flawed and their modifications are necessary.